U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF DALLAS COUNTY, ALABAMA.

BY

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[Advance Sheets—Field Operations of the Bureau of Soils, 1905.]

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[PUBLIC RESOLUTION—NO. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the Congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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LOCATION AND BOUNDARIES OF THE AREA.

Dallas County is situated just to the west of the center of Alabama, lying between 32° 3′ and 32° 40′ north latitude and 86° 50′ and 87° 28′ west longitude.

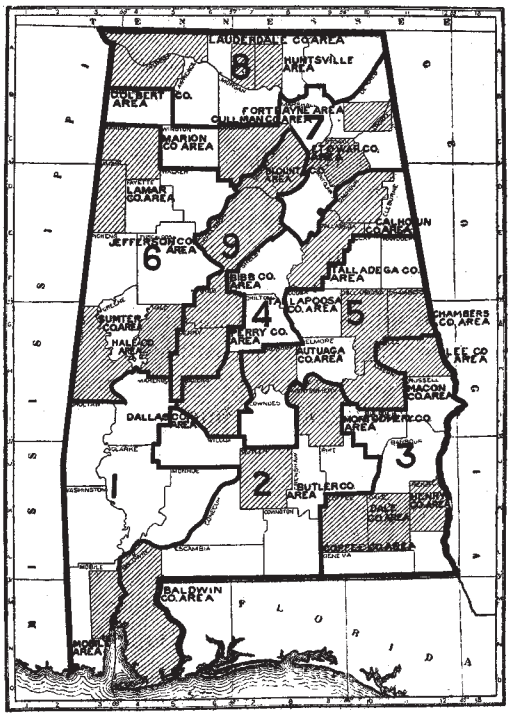

FIG. 1.—Sketch map showing location of the Dallas County area, Alabama.

The county is irregular in shape, and is bounded on the north by Perry and Chilton counties, on the east by Autauga and Lowndes counties, on the south by Wilcox County, and on the west by Wilcox, Marengo, and Perry counties. Its area is 635,136 acres, or nearly 1,000 square miles. It is traversed in a northeast and southwest

direction by the Alabama River. The city of Selma, the county seat and only city in the area, is at the head of the all-year navigation on the Alabama River, and is known in the State as the "Central City." The base map used in this survey was taken from a county map.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

Dallas County was organized February 9, 1818, one year after the date when Alabama was organized as a Territory, and one year before the date when it was reorganized as a State. The territory for the county was taken from Montgomery County, and was named in honor of A. J. Dallas, of Pennsylvania.

Soon after 1818, when warfare with the Creek and Cherokee Indians had largely ceased, immigrants came from Virginia, the Carolinas, Georgia, and Tennessee, and the principal planters in the county to-day are largely descendants of this stock. In 1820 a majority of the 6,000 inhabitants were white, while in 1870 the population of 40,000 was about four-fifths colored. Of the present population (census of 1900) of 55,000, probably the same proportion are negroes.

Cotton has always been the chief, almost the exclusive, crop in this section. On the large plantations operated by slave labor some rice and tobacco were grown, with corn to feed the stock and hogs to make pork for the slaves, but cotton, the ready-money crop, was then, as now, the staple farm product, to the production of which all other operations were adjusted, and since in the cultivation of this staple the essential operation was the picking, the main consideration with the planters on their large estates was to plant as much cotton as the slaves could gather, and when these lands became exhausted to clear up new tracts.

While such a system of extensive farming did not prove, in the case of the less-exacting cotton crop, so ruinous to the lands as a somewhat similar system of extensive cropping in the bonanza wheat-farming of the Northwest, it did, nevertheless, discourage any effort to maintain the fertility of the soil or to renovate old lands, and put a premium on land robbing. For the situation was here, as all through the South, more an economic question than an agricultural one. Lands were abundant, waiting to be cleared, and labor was plenty. There was no pressing necessity to consider intensive practices. With the increasing demand for land and the loss of slave labor the need of getting more out of the land and of making the hired labor more efficient has become important. The introduction of chemical fertilizers is also serving to emphasize the need of more systematic and intensive farming, for it has become pretty well established that it does not pay, as a business proposition, to buy fertilizers for lands that are poorly tended, and that to make the investment for fertilizers

a profitable one, the soils must be kept in good tilth. In late years, also, the opening of northern markets to truck and fruit shipped from this section has encouraged diversified farming, and the recent ntroduction of improved cattle gives promise of considerable development in that industry.

The system of land tenure that has developed since the war is in many respects a drawback to the agriculture of the area, and is discussed in greater detail under "Agricultural conditions."

CLIMATE.

The following table, compiled from records of the Weather Bureau, shows that the Cretaceous prairie lands in the western part of Dallas County, represented by the data for Uniontown, in the adjoining county of Perry, have a somewhat higher temperature and a less precipitation than the sandier country around Selma. The figures given are normals computed from records covering a long period of years.

The date of the first killing frost in the fall is given by both stations as the second week in November; while the last killing frost in spring is recorded for Uniontown as the second week in March and for Selma as the last week in March. This gives a growing season of two hundred and thirty to two hundred and forty days, approximately.

Normal monthly and annual temperature and precipitation.

Month.	Selma.		Uniontown.		Month.	Selma.		Uniontown.	
	Temperature.	Precipitation.	Temperature.	Precipitation.		Temperature.	Precipitation.	Temperature.	Precipitation.
	°F.	*Inches.*	°F.	*Inches.*		°F.	*Inches.*	°F.	*Inches.*
January	40.0	4.58	47.1	4.75	August	80.6	5.65	80.8	4.75
February	47.8	6.28	48.2	6.44	September	76.0	2.04	76.6	2.50
March	58.1	7.37	56.3	5.35	October	66.4	2.15	67.0	2.01
April	63.6	4.44	65.8	3.95	November	54.8	3.22	56.0	3.10
May	72.3	2.65	73.5	4.00	December	47.3	4.44	50.3	3.88
June	78.9	4.23	80.1	4.45					
July	81.4	4.67	81.7	5.47	Year	63.9	51.72	65.3	50.65

PHYSIOGRAPHY AND GEOLOGY.

The physiography of Dallas County comprises three distinct divisions—first, the hilly uplands in the northern and southern parts of the county; second, the sandy plains which border the Alabama River in its northeast and southwest course through the county; and, third, the rolling prairie or "canebrake lands" in the western part of the county.

The hilly upland area is composed of the Tuscaloosa and Eutaw formations across the northern edge of the county and of the Ripley formation in its southern portion, all of Cretaceous age. But these

geological horizons, consisting of cross-bedded sands and clays, have been so overlain by the Lafayette mantle of later age that they exert little appreciable influence upon the derivation of the soils. The topography of this district is rough rolling to hilly, showing at times marked erosion, and rising to a maximum elevation of about 300 feet. The soils of this division comprise the Orangeburg fine sand, Orangeburg fine sandy loam, and Orangeburg clay, all derived from the Lafayette sands and clays. In the southern part of the county, especially, there is a well-defined series of gravel-capped hills, indicated on the map by the gravel symbol, which mark the more resistant crests of eroded sandy ridges. There are also found irregular outcroppings of the Selma chalk, giving rise to more or less isolated patches of heavy prairie clay within the sandier soils.

The second physiographic area consists of a sandy plain which borders, in a rough way, the tortuous course of the Alabama River, and which derives its character from the consequences of this river's agency. This alluvial flood plain of the Alabama River differs, however, from most southern river plains in having very little heavy bottom land subject to annual overflow. The reason for this is that the Alabama River has cut a decided gorge—or minature canyon—30 or more feet deep into the underlying soft Cretaceous shale, with the result that in case of floods this gorge is glutted, while the banks are seldom, or in but few cases, flooded by the stream. Since the soils along the river are in general quite sandy and free from overflow, it seems evident that this alluvial area was not formed under present conditions, but represents an ancient deposition-plane at a time when the Alabama River was a wider stream or an estuary emptying into the near-by shallow waters of the Gulf and before the subsequent uplift in the land had induced the present canyon cutting in the stream. This view is supported by the occurrence of two sharply defined level plains, one east of Selma, the other between the river and Orrville, both now quite inland and wholly beyond the scope of river action, and which represent probable embayments in such a wide and shallow estuary. The smaller streams which empty into the river also show wide sandy second bottoms, indicating a previous wider plane of deposition.

The geological age of these river or estuary deposits is quite recent (Pleistocene) and the topography of this area is noticeably level, becoming gently rolling as the uplands are approached. Several considerable bluffs, here and there along the river, show where ridges from the Lafayette uplands finger in at different points down to the course of the stream. The elevation at Selma is 147 feet, and this may be taken as fairly representative of this plain area. The characteristic soils of this division are the Norfolk series—Norfolk sand, Norfolk fine sand, and Norfolk fine sandy loam—showing coarser and

finer grades of sediments. In certain areas constituting a lower river terrace, subject to occasional overflow, and especially near the mouths of the smaller streams which empty into the river and whose banks are overflowed in times of floods by backwater from the river, we find the Norfolk clay and the Ocklocknee clay, two heavier bottom soils.

The third physiographic division consists of the gently rolling prairie lands in the western and northwestern part of the county. These are known as the "canebrake lands," or the "black belt," and are derived from the weathering of the Selma chalk or Rotten limestone of Cretaceous age, which was laid down as an offshore deposit in deep water, and from which the Lafayette covering has been removed by erosion. This formation is exposed along the Alabama River and its tributaries and appears in large measure to underlie the entire county at a slight depth. It consists of thin beds of white limestone, from which Portland cement can be produced in select localities. Where it outcrops and weathers, especially in this western portion of the county, it gives the Houston clay—a heavy prairie soil.

Dallas County is well watered, the drainage of the smaller watercourses being southeast or northwest into the Alabama River. The Cahaba River empties into the Alabama near the center of the county.

SOILS.

There are eleven types of soil in Dallas County. These are shown in color on the map accompanying this report. The table below gives the area of each type and the proportion which each forms of the total area surveyed:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk fine sandy loam	163,392	25.7	Meadow	11,584	1.8
Orangeburg fine sandy loam	159,040	25.0	Orangeburg clay	9,024	1.4
Houston clay	149,184	23.4	Swamp	8,192	1.3
Norfolk clay	61,312	9.7	Norfolk sand	7,168	1.2
Ocklocknee clay	29,056	4.8			
Norfolk fine sand	23,872	3.8	Total	635,136	
Orangeburg fine sand	13,312	2.1			

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam consists of a gray to dark-gray fine sand or fine sandy loam to a depth of 15 inches or less, overlying red sandy clay. This soil frequently contains small iron concretions, and at times bands of fine gravel. It is one of the widely distributed soils of the county, occurring as the main upland type in the northern and

southern portions. In its topography it varies from rolling to quite hilly, and in places shows decided erosion. The drainage is good, and the soil frequently suffers from washing. Where this tendency to wash is developed with some uniformity over sufficient territory the soils grade into the Orangeburg clay.

The Orangeburg fine sandy loam is derived from the sands and clays of the Lafayette mantle, and is one of the characteristic soil products of that geological horizon. This Lafayette formation has been subjected to great erosion since its elevation above water, resulting in very unequal surface features for this soil type. Sandy ridges vary with gravel-capped hills, while in numerous directions the small brooks and creeks have developed their miniature valley systems often to a surprising degree.

The Orangeburg fine sandy loam is adapted to general farming, giving good yields of cotton and fair yields of corn and oats. It is especially well adapted to peaches, and in the adjoining county of Perry, together with the Orangeburg clay, is being used for the experimental production of a high grade of domestic Cuban filler tobacco.

Much of this type is still in forest, composed of a fair mixed growth of pine, hickory, black oak, and red oak, in which lumbering is occasionally conducted. The type, from its high position, is excellent for residence but offers difficulties to farming where the land is more rolling and subject to washing.

The gravel-capped hills and ridges, indicated on the map by gravel symbol, and found more prominently in the southern portion of the county, must be separated as the gravelly phase of this type. These areas are in general quite hilly in character and unsuited to general farming, but peaches are found to thrive on their well-drained hillsides. Such areas are as yet largely uncleared.

The yield of cotton on the Orangeburg fine sandy loam averages from one-half to three-fourths bale per acre.

The value of these lands ranges, according to location, proximity to railroads, etc., from $8 to $30 or more an acre. Many of these lands, however, can only be obtained by purchasing in large tracts, in which case a lower price can be secured. When leased, a yearly rental of $2 to $3 an acre is asked.

The following table gives the average results of mechanical analyses of samples of the Orangeburg fine sandy loam:

Mechanical analyses of Orangeburg fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*		*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12700, 12702.....	Soil.....	1.3	12.2	12.1	36.7	16.1	14.5	6.3
12701, 12703.....	Subsoil.....	.3	5.8	7.6	25.2	12.5	18.4	29.3

ORANGEBURG FINE SAND.

The Orangeburg fine sand consists of a gray to brown fine sand to a depth of 15 inches or more, containing usually some iron concretions, underlain by red sandy clay. Irregular bands of gravel are sometimes found through the type. This soil is found here and there in the Lafayette uplands, wherever the surface soil of the Orangeburg fine sandy loam is developed to the requisite depth to pass into this type. The largest body is found in the northern part of the county, between Selma and Plantersville. Its topography is rolling to hilly; very similar to that of the Orangeburg fine sandy loam. The soil is well drained, and some areas show considerable erosion.

The Orangeburg fine sand is derived from the sands and clays of the Lafayette covering. It is especially adapted to peaches, is a good soil for truck crops, and is a somewhat earlier producing soil than the Orangeburg fine sandy loam, though not so uniformly productive.

Cotton yields from one-third to two-thirds bale per acre, and fair crops of corn are obtained. The area of the Orangeburg fine sand is inconsiderable in Dallas County, and with reference to local conditions the soil might be most aptly described as a sandy phase of the Orangeburg fine sandy loam.

The following table shows the average results of mechanical analyses of the Orangeburg fine sand:

Mechanical analyses of Orangeburg fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12696, 12694.....	Soil.....	0.0	3.1	19.4	53.5	7.2	8.5	7.9
12697, 12695.....	Subsoil.....	.0	1.8	12.5	45.8	4.3	6.6	28.2

ORANGEBURG CLAY.

The Orangeburg clay consists of a dark-red heavy sandy loam or light loam to a depth of not exceeding 4 inches, overlying a red sandy clay subsoil. On cultivated areas the transition between the soil and subsoil is more gradual both in texture and in depth, due to the effects of plowing and high bedding.

The Orangeburg clay occurs in the higher parts of the uplands, the main bodies of the soil lying in the neighborhood of Summerfield and north of Richmond. Its topography is at times very hilly, but there are frequently to be found high but fairly level areas which make very good farming lands. The occurrence of such level tracts at the most elevated position of the uplands indicates that the present crests of the hills and ridges were once the plane of an extensive and uniformly level peneplain, and that these hilltops and ridges are the results of excessive erosion upon such a peneplain, and by no means due to any process of violent uplift. The soil is well drained, and in the hillier areas must be protected from washing.

The Orangeburg clay owes its origin to marked erosion of the Lafayette sands and clays in the uplands, and is developed where the sandy surface soil is measurably removed from such soils as the Orangeburg fine sand and Orangeburg fine sandy loam.

The Orangeburg clay is the best adapted to general farming of any of the Orangeburg soils. Cotton yields from one-third to 1 bale per acre and corn from 15 to 35 bushels. Oats do well also, but wheat is rarely planted in Dallas County, owing to its liability to rust. It is probable that this tendency to rust could be somewhat overcome by taking special pains to plant the wheat very early in the fall (August or September) and so hastening an early maturity in the spring. But at this time of the year the cotton crop generally engrosses all attention, and, moreover, the season is liable to be dry for planting.

The tracts of Orangeburg clay are pretty well cleared up in this county, the native growth being mostly hardwoods. It is said, however, that while crops produce more on this soil in good seasons than on the sandier types, they are liable to suffer from drought even more than on the sandy soils. This type has, however, naturally a higher moisture capacity than these sandier soils, and its liability to drought must be traced to the fact that it is plowed too shallow. This shallow plowing is not so prejudicial on the sandy soils because there is always a considerable sandy root zone before the clay subsoil is reached. But on this clay soil, unless plowed deep, the crops are unable to develop a sufficiently deep root system in the unbroken clay, and the surface roots suffer as soon as the shallow-tilled surface dries out.

The value of the Orangeburg clay is probably somewhat higher than the value of the Orangeburg fine sandy loam, running from $8 to $40 an acre. In Perry County both these types are being used for the experimental growing of a Cuban seed filler leaf tobacco, and if successful this will give these soils added value.

The average results of mechanical analyses of samples of the Orangeburg clay are given in the following table:

Mechanical analyses of Orangeburg clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12706, 12704.....	Soil.....	0.0	1.4	6.3	38.7	4.3	19.1	29.7
12707, 12705.....	Subsoil.....	Trace.	1.1	5.2	29.5	3.7	16.5	43.7

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam is a gray fine sandy loam, underlain at a depth of about 20 inches by a yellow sandy clay. This type is the most widely distributed soil in the area, and is found, some distance back, along the main water courses. The two largest bodies

approach the Alabama River from each side, east and west, about the center of the county.

Like the other Norfolk types, the Norfolk fine sandy loam is mainly a river-plain type in this area, the topography varying from large level areas of low plains to gently rolling hills as the uplands are approached. The soil is generally well drained, except in certain depressed areas in the level plain between Cahaba and Orrville, which do not dry out adequately until late in spring, and which would be readily improved by a drainage system. This type owes its origin to former estuary depositions, and in the more rolling areas to the sands and clays of the Lafayette formation.

The Norfolk fine sandy loam is well adapted to late truck crops and to cotton. In this area it is largely devoted to the production of cotton, although some truck is grown upon it also. It is also used to grow corn, giving moderate yields. The lower lying areas of the type are better adapted to corn than the more rolling portions.

It is advisable, in this county, to recognize as a special phase of the Norfolk fine sandy loam the lower lying plain areas similar to the depressed areas between Cahaba and Orrville, above referred to. These tracts have in general a somewhat shallower surface soil than the main portions of the type, with doubtless a higher proportion of very fine sand and silt, and they are, as a rule, so moist that they would be greatly benefited by artificial drainage. It would seem that these lower lying and shallow-surfaced areas would be well adapted to growing strawberries, as this crop, on account of its short root system, is liable to suffer from drought or be "burned out" if grown on the sandier phases of this type. Cabbages would also doubtless be more at home on this moister phase. The sandier phases of the main type, however, constitute a better all-round truck soil.

Cotton yields on an average from one-third to one-half bale, while corn seldom produces over 10 bushels per acre.

A good proportion of this soil is cleared and under cultivation. The native forest growth consists largely of pine and live oak, and some lumbering is still conducted in the lower lying areas, which are more subject to malaria and occupied mostly by negro tenants. Its value is about the same as that of the Orangeburg fine sandy loam.

The mechanical analyses of samples of the Norfolk fine sandy loam are shown in the following table:

Mechanical analyses of Norfolk fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12690, 12688.....	Soil.....	Trace.	1.7	6.4	52.6	15.4	16.6	6.9
12689, 12691.....	Subsoil.....	0.3	3.1	6.7	33.2	17.6	18.4	25.0

The following sample contains more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 12689, 0.88 per cent.

NORFOLK FINE SAND.

The Norfolk fine sand is a fine, gray, loamy sand, 8 to 10 inches deep, underlain by a yellow fine sand, slightly more loamy and adhesive. The soil is quite friable when dry, but has a tendency to pack or form a surface crust after being wet. It is mainly found along the courses of the Alabama and Cahaba Rivers, with occasional areas in the uplands. The topography varies from a series of level plains to more rolling hillside areas in the uplands. The drainage is good, but the soil is not leachy like the Norfolk sand.

The Norfolk fine sand has been formed in two ways. Along the river courses it represents the finer sand deposits, while in the uplands it represents areas where the fine sand materials of the Orangeburg fine sand and Orangeburg fine sandy loam have accumulated to such depth as to necessitate a change in the classification. The sand accumulation, it was noted, is generally due either to the washing out of fine sand and its accumulation at the base of the hillsides, or to accumulation by soil creep, sometimes seen just at the break of the hillsides.

This soil, like the Norfolk sand, is best adapted to early truck, small fruits, and peaches, and is too light for general farming purposes. The yield of corn is scanty. Cotton is the crop generally planted on this soil, but the yields are so dependent upon the use of chemical fertilizer that they are but little indicative of the strength of the soil Perhaps one-third bale of cotton per acre is the average yield. This type is nearly all under cultivation, which indicates that it is a better cotton soil than Norfolk sand, on which the cultivation of this crop is the exception.

The following table shows the results of mechanical analyses of the Norfolk fine sand:

Mechanical analyses of Norfolk fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12686, 12684	Soil	0.1	5.0	25.0	41.3	6.1	12.7	9.8
12685, 12687	Subsoil	Trace.	3.8	22.1	39.9	6.5	16.4	10.9

NORFOLK SAND.

The Norfolk sand is a coarse to medium gray sand, very loose and incoherent, resting on a yellow sand of the same texture, extending to a depth of 3 feet or more. It occurs as small, irregular areas scattered here and there throughout the course of the Alabama River plain. Its topography assumes the form of loose sand knolls, attaining at points the character of dunes, devoid of sod or other plant covering. On account of its coarse texture and somewhat elevated

position the soil drains readily and crops suffer from drought. The patches of this soil generally occur close to the river front, and represent the coarser sediments of earlier river action.

The Norfolk sand makes a poor soil for general farm crops, but is well adapted to early truck, except such vegetables as cabbage, which require a heavier subsoil. Small fruits and peaches also do well, especially if grown for an early market. The soil is in general adapted for those crops in which quick maturity without interruption of growth and tender quality of leaf are more sought for than quantity of yield.

The native vegetation of the Norfolk sand in this area is merely a scrub growth of live oak and wild cactus. Where cultivated it is used for cotton, but gives a very light yield even in favorable seasons. Some small patches were seen planted in corn, but corn is not to be recommended.

It is well to mention a stronger phase of the Norfolk sand which was found in the area. This phase has a more level position, the surface soil contains more organic matter, and the subsoil is somewhat sticky and shows a decided red color. This is simply a heavier phase of Norfolk sand, and though likewise liable to suffer from drought, it produces fairly good yields of cotton in average seasons.

There is also an occasional spot of Norfolk sand to be found in the uplands, where the finer materials have been washed out of the Orangeburg fine sand and the subsoil of coarse sand made deeper.

The following table shows the average results of mechanical analyses of samples of the Norfolk sand:

Mechanical analyses of Norfolk sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12678, 12680.....	Soil.....	0.3	26.4	45.2	18.2	1.3	2.2	5.8
12679, 12681.....	Subsoil.....	.1	22.3	47.6	22.1	1.2	1.9	4.6

HOUSTON CLAY.

The Houston clay, known as the prairie "canebrake lands" and as the "black belt," consists of a gray, brown, or black loamy clay, with a depth of 6 inches, overlying a very heavy gray or mottled yellow clay to a depth of 3 or more feet. This material is underlain at varying but shallow depths by the typical Rotten limestone, or Selma chalk. Lime concretions are found throughout the profile, especially in the subsoil.

This soil occurs in the western part of the county as a large compact area, extending from the Cahaba River north and west into Perry County. Other considerable areas are also found north of

Selma and in the southern part of the county, as well as in scattered irregular outcroppings. Its topography is that of a gently rolling prairie, and the drainage is very good. In some areas the soil is subject to washing.

The Houston clay is derived from the weathering of the Selma chalk or Rotten limestone of Cretaceous age, and is the only soil in the area in which atmospheric weathering and the solvent action of rain water have played a decided part in the derivation of the type. Portions of this soil are colored red, yellow, and brown, indicating varying contents of iron. As a result of its high lime content, the soil shows very decided flocculation of its clay materials, a feature of much agricultural importance on such a heavy type. The lime concretions contain sometimes a small proportion of phosphate, so that this soil is to this extent self-fertilized.

It is needful to recognize two special phases of the Houston clay apart from the main type just described. The first of these is the "lime-hill" phase, in which the underlying shaly limestone is close to the surface, with the result that the surface soil is thin and washes badly, showing frequent gall spots. The occurrence of this phase, however, is too irregular to be indicated on the map. Farm crops grown on this phase are subject to drought, and the best purpose to which such tracts can be put is the growing of forage crops that do not require clean cultivation, with its attendant inducement to washing, and serve to bind the soil and to accumulate a deeper soil cover.

The second special phase of Houston clay consists of those marginal areas of the type, where this soil begins to grade into the neighboring sandy types and is slightly modified by their materials. This phase has practically the same texture as the main type, but is covered with a very thin veneer of sand on its surface, and occasionally contains some fine gravel. Such areas represent locations in which the Lafayette covering has not been so completely removed as in the main type, but this slight modification is lost sight of when these lands are plowed, or exert, if any, a slightly beneficial action upon its texture. These tracts, sometimes known as "red post-oak prairie," are frequently of a yellow to red color, which seems to indicate that they have been stained, in part at least, from the but recently removed Lafayette cover, which is uniformly rich in iron concretions.

The Houston clay, while clodding badly when plowed too wet, and requiring care in its management, is a very strong and productive soil and is especially adapted to forage crops and live-stock raising. It is the chosen home of the Johnson grass and of the Melilotus clover, while alfalfa does surprisingly well for such a heavy soil. The cattle industry is being developed on these lands in the county, and gives good promise of success. Cotton produces from three-fourths bale to over a bale per acre, although in some cases it is said

that the rich soil encourages excessive growth of stalk at the expense of the set of bolls. On such exceptionally rich tracts corn is the safer crop for the first seasons. The yield of corn runs from 20 to 50 bushels per acre. The growth of fig trees on this soil was noted to be very fine.

The Houston clay supports in general only a meager and scattered forest growth. It is fairly well watered with streams, but surface wells are impracticable on account of the shallow depth to bed rock and the lack of seepage in the dense subsoil. Water is generally obtained in abundance from artesian borings, but cisterns are largely used for the household supply.

The value of the Houston clay lands is from $12 to $50 per acre, and a yearly rental of $3 to $4 per acre is generally obtained when the land is leased.

The average results of mechanical analyses of samples of the Houston clay are given in the following table:

Mechanical analyses of Houston clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12672, 12676.....	Soil.....	0.6	2.1	2.5	13.5	8.9	25.8	46.7
12673, 12677.....	Subsoil.....	.2	.9	1.0	6.4	2.1	15.4	72.1

The following samples contained more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 12672, 35.94 per cent; No. 12673, 7.72 per cent; No. 12676, 24.20 per cent; No. 12677, 51.91 per cent.

NORFOLK CLAY.

The Norfolk clay consists of from 2 to 5 inches of heavy fine sandy loam, or loam underlain by a stiff, mottled, reddish and yellow clay. It occurs prominently along the courses of the Alabama and Cahaba rivers, occupying the lower areas in their river plains and being subject in some places to occasional overflow. Its topography is flat and low lying, the soil occupying an intermediate position, in location as well as in texture, between the terrace phases of Norfolk fine sandy loam and the heavy river bottom areas of Ocklocknee clay. The drainage is generally poor and in need of artificial improvement.

The Norfolk clay type owes its origin to the deposition of finer sediments, and is found most characteristically on the concave side of the river bends.

A little surface ditching is generally sufficient to insure adequate drainage, when the Norfolk clay becomes a productive soil. On account of its position it is able to withstand considerable drought. The soil is well adapted to general farm crops, yielding three-fourths to one bale of cotton and 20 to 40 bushels of corn per acre. It is also capable of yielding good crops of hay, but has been used for this purpose but very little in Dallas County.

The Norfolk clay soil is very liable to clod if plowed wet, and, because the type is somewhat late in drying out in the spring, it generally is plowed in too wet a condition. Proper drainage is the only way to make the soil dry enough for early plowing, unless cover crops are planted in the fall and cut in early spring after their renewed growth has taken up some of the excessive moisture.

The Norfolk clay is known locally as "sandy hammock land," or as "isinglass land," although these terms are applied with little consistency.

These lands are largely leased to negro tenants at an average annual rental of $2 an acre.

The following table shows the average results of mechanical analyses of samples of Norfolk clay:

Mechanical analyses of Norfolk clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12710, 12708.....	Soil.....	0.1	1.3	3.3	21.4	17.7	34.5	21.3
12711, 12709.....	Subsoil.....	Tr.	.3	1.5	20.8	11.2	24.2	41.3

OCKLOCKNEE CLAY.

The Ocklocknee clay is a dark-gray silt to clay loam, with a depth not exceeding 6 inches, overlying a very heavy dark-brown clay. It occurs in small areas along the Alabama and Cahaba rivers, as the lowest river terrace subject to overflow, but its main area is found in the heavy bottom lands along the smaller tributaries of the Alabama River, like Boguechitto, Morgan, and Cholatchee creeks. Its drainage is very poor, and for systematic cropping the soil would require both draining and diking. This type is due to the deposition of silt and clay sediments laid down chiefly in times of floods, when backwater from the Alabama River causes the smaller tributaries to overflow their banks. The texture of this soil shows some variation, according as it is modified by wash from the sandy hillsides or grades into the Houston clay as the prairie is reached.

This soil is difficult to till, and clods badly unless plowed when dry. It is known locally as "black swamp" land, and on account of its rather unhealthy location is occupied almost exclusively by negro tenants. When properly plowed and cultivated it is a strong soil, yielding 20 to 50 bushels of corn and a bale of cotton per acre. Like the Orangeburg clay in this respect, the Ocklocknee clay is said to suffer from drought, and cotton is reputed to rust in dry seasons, no doubt for the reason that the stubborn clay is plowed so shallow. On such a heavy soil, plowed shallow and without the mellowing effects of any incorporated organic matter, cotton, and especially corn, may

well suffer in dry seasons from the inability of the tenacious soil to deliver its water supply as fast as required.

The Ocklocknee clay is well adapted to grow hay and for pastures, but is not used for these purposes to any extent, except in some limited areas which have a growth of wild cane.

The table following shows the average results of mechanical analyses of the Ocklocknee clay:

Mechanical analyses of Ocklocknee clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
12670, 12668.....	Soil.....	0.2	1.0	1.9	15.3	11.0	37.7	36.6
12669, 12671.....	Subsoil.....	Tr.	.6	1.3	15.6	9.6	35.5	37.0

The following samples contained more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 12668, 3.41 per cent; No. 12669, 0.92 per cent.

MEADOW.

The Meadow consists of low-lying and poorly drained tracts near the head of some of the small tributaries of the Alabama, and too wet for systematic cropping. The soil is a heterogeneous mixture of sand and silt, being the sandy wash from the hills mingled with overflow deposits. In winter these lands are quite wet, but in midsummer they frequently dry out so as to yield good pasturage, and some of the grass is cut for hay. In a season of protracted drought they may make good corn yields.

Some of the Meadow can be readily drained, and would then afford good lands for corn and grass, especially for such a grass as redtop, which requires a moist location in this climate.

Sugar cane is said to do its best on the strips of moist sandy "branch land," similar to Meadow, better than on the heavier bottom soils (Norfolk clay and Ocklocknee clay). The yield is smaller than on the stronger soils, but the sugar content is higher and the flavor more delicate. The sandier bottoms induce a quicker growth and a finer texture in the plant. As a result the main energies of the plant are consumed in elaborating sugar for the immediate food requirements of the rapidly maturing cane, and less of its energy is diverted, at the expense of its sugar content, to storing up starch as a reserve food for a prolonged and excessive growth, such as clay soils give.

SWAMP.

The Swamp type of soil has no agricultural value, and consists of depressed areas along the smaller tributaries of the Alabama River, covered most of the year with standing water and occupied by a heavy growth of cypress and other water-loving trees. The more

prominent areas of Swamp are Langs Pond, on Morgan Creek, and Blue Girth Swamp, on Beech Creek. There is no Swamp along the immediate course of the Alabama or Cahaba Rivers. It is doubtful if any of this area could be profitably reclaimed.

AGRICULTURAL METHODS.

The agricultural methods of the area are very largely a matter of convention, and not as well adapted to the different types of soil as their variation in character seems to make advisable. We do, indeed, find on the heavy prairie lands a style of plow with a more oblique plowshare than that in the plow used on the sandier soils. The constant growing of cotton and corn, on the other hand, has tended to establish a too uniform method of cultivation on the different soil types.

Fall plowing is seldom practiced, although it would doubtless be beneficial on the heavy prairie lands. The disintegrating action of frost would serve to break down the compact clay and make the soil mellower, besides making plant food available by weathering. On the other hand, fall plowing may be injurious to sandy soils unless they are subsoiled, as it may otherwise cause them to wash and to pack or cement together badly after the winter rains.

It would seem that deeper plowing can be safely and profitably practiced on all the soils if properly conducted, for on very many of the soils of the area, and especially on the sandier types, there is found a well-developed hardpan or layer of hard and closely compacted sand, 2 or 3 inches below the surface, due to turning these soils when too wet and afterwards plowing at the same shallow depth for years. This hardpan causes the soils to shed the winter rains instead of absorbing them, and thus encourages washing. For the same reason the crops suffer in dry seasons, because the development of a root system is hindered and the capillary water supply is obstructed. The remedy for this hardpan is in plowing, which must be gradually deepened for a number of years. Some farmers claim that deep plowing "kills" these sandy lands, and this opinion may be well founded if this inert and unweathered hardpan is turned up on top of the mellow top soil all at once. If, however, this turn plowing is done gradually, going just a little deeper each year, a seed bed of good depth could soon be established without such harmful results. Subsoiling, however, is the readiest remedy for this hardpan, and is to be highly recommended on these shallow plowed beds. In this way the hard layers are broken down and mellowed without being turned on top, and the soils are benefited in several ways. On the heavy prairie soil deep turn plowing is said to be a safe practice, just as is fall plowing on this soil, but on the sands and sandy loams subsoiling is the surest operation.

Little attention is given to the rotation of crops, as land is plentiful and commercial fertilizers are largely relied upon to keep up crop yields. The common practice is to follow cotton with corn in case any rotation at all is attempted, or to intersperse corn in the cotton rows year after year without rotation of any sort. Since both these crops require clean cultivation, they rapidly exhaust the humus in the soil. Where manure is not used the only way to replenish the humus is to introduce some crop into the rotation which will leave a stubble or sod to be plowed under. Oats will suggest itself as the most usual crop with a stubble that is planted in this country, and it would be well to grow this crop in a rotation with corn and cotton. But it is the leguminous crops—cowpeas, crimson clover, or the familiar lespedeza—that are to be especially recommended, both because they can be turned under to add humus and because of their specific benefit in enriching the soil with nitrogen. One of these legumes should be a factor in any rational scheme of rotation.

Cottonseed meal and acid phosphate are the two fertilizing materials most largely used in the Dallas County area, and there seems to be a disposition to leave out the potash salts, probably because the other fertilizers are southern products and more readily obtainable. Some of the sandy upland soils, as well as some of the heavy bottom types, show by the character of their growth that applications of lime would be very beneficial.

There are found, at several localities in Dallas County, noticeably at the contact of the Lafayette and Cretaceous limestone formations, seams of phosphate rock and greensand, which show an analysis of 2 to 5 per cent of phosphate of lime. Some of these materials are worthy of trial, where they can be ground up, as phosphatic fertilizers. A very efficient homemade superphosphate is known to have been made from this source by the use of sulphuric acid.

There are also to be found, scattered through the Selma chalk, small beds of large shells which yield, on burning, a good quality of lime.

AGRICULTURAL CONDITIONS.

The prosperity of the farming class in different parts of Dallas County is quite divergent, as is to be expected in an area which shows such marked contrasts in its social and economic conditions. Since only about 11 per cent of the farms are operated by their owners the small independent farmer is not the characteristic type of agriculturist, but the farming class is quite sharply divided into the white landholder and the negro tenant. The prosperity of the landholder, who is frequently likewise a merchant, is, in general, very good, many of them being owners of large tracts of land and in affluent circumstances. Their homes are commodious and well appointed and in striking contrast to the rude cabins of the negro quarters. On

account of the mild climate the barn is an undeveloped affair and takes the form of a more or less open shed. Fences are in general unnecessary, except where improved cattle must be kept isolated from the common scrub stock, and in such cases the rail fence is the usual type.

The tenant system in common vogue is an outgrowth of the conditions following the abolition of slavery. The predominating negro tenant is classed either as a "halves tenant" or as a renter. In the first case the tenant or tenants—for the negroes sometimes prefer to lease land together in a small squad—are furnished the land and mules and get half the crop. The renters are those negroes who own their own teams, and they pay a rental of $2 to $3 an acre for the sandy lands and from $3 to $4 for prairie tracts, or they may pay from $40 to $60 for a "mule's land" and work as much as they can with one team. In all cases the landowner furnishes them houses (cabins). These tenants and renters are not furnished rations, but a characteristic system of "advancing" is practiced to insure them food during the crop season. From about the 1st of March until August the landholder—and for this reason generally a merchant, too—advances rations, such advances being charged against the crop. He also in a measure oversees the production of the crop.

Other negroes are employed by the landowners for their own service. These "contract hands," or "wages squad," get from $8 to $10 a month, are furnished rations, and in some cases are allowed the use of 3 acres of land and given a mule to work it on Saturdays.

While this tenant system no doubt has its economic justification in the conditions it has to meet, it does nevertheless embody some serious disadvantages to the agricultural progress of the area. First and foremost, it tends to place the conduct of farming operations out of the hands of the landowners and to intrust it to the tenants, who, as a matter of course, give little or no thought to the welfare of the land. The consequence is that the landholder is brought into competition with a lower class of producers, whom he himself serves to support, the price of cotton is forced down, and skilled farming is put at a discount. The tenant, on his side, is obliged to pay a high interest on the advances made him to protect the merchant against loss on such risks, and has little chance to better his condition. It would seem that with a larger class of owners conducting farm operations themselves, and a consequent increase in the number of wage hands, the condition of both classes would be probably bettered and the chance given to control the cotton acreage by diversifying crops. The price of the staple would not then be so subject to decline from thoughtless overproduction.

The average size of the farms in the area is 64 acres, but many of these are parcels of large tracts of land embracing several thousand acres under one ownership.

The labor is entirely that of the negro class, and is quite efficient when properly supervised. Some of the lower lying portions of the area are unsuited to white labor on account of malaria.

Some improved farm machinery is to be found, but on account of the abundance of labor this does not become such a vital question in this section. In fact, some of the most intelligent farmers deliberately withhold the use of improved machinery from their hands in order to provide them more constant employment, and for the reason especially that so many hands must be kept together to tend and pick the cotton crop.

Cotton is, as stated, the chief product of the county, occupying about one-third of its entire acreage and giving a production of over 48,000 bales. This places Dallas County among the largest cotton-producing counties in the State. Corn ranks second, with an average yield for the county of 14 bushels per acre. Oats and sweet potatoes follow in order, but with a greatly reduced acreage. The production of hay is not known, but a good quality of Johnson grass hay is produced on some of the prairie lands and this industry has bright prospects. The trucking interests are just beginning to be developed, and radishes, peas, Irish potatoes, tomatoes, and strawberries are grown on the lighter sandy soils for early shipment to northern and western markets. The peach industry is also making progress on the Orangeburg fine sandy loam uplands, the chief varieties grown being the Elberta and Slappey varieties.

The raising of beef cattle is one of the newer agricultural industries which is gaining ground in this area, especially on the Houston clay type of soil. Improved herds of Hereford, Shorthorn, and Red Polled cattle have been introduced and give promise of marked success where the grazing season is so long, where the Johnson grass does so well, and where Bermuda grass and Melilotus clover furnish desirable pasturage. As this section lies below the quarantine line, cattle brought in from northern localities must be inoculated against tick fever.

The acreage in sugar cane is larger than that in sorghum, and its growth is at present receiving renewed attention. As already stated, the sandier second bottom lands are found to produce a stalk of higher sugar content than the heavier clay bottoms, and on the same principle the upland cane on the Norfolk fine sandy loam and the Orangeburg fine sandy loam is claimed to have a still higher sugar content, but with a likewise lower yield than the sandy "branch lands." It is largely a question of business profits—that is to say, of special markets—how far this sacrifice of yield to quality can be successfully carried in preferring the sandy uplands for the growth of this product.

The sandy bottom lands are preferable also for the production of pecans, some orchards of which have been lately planted.

Such cases as those just cited indicate that there is a fair recognition of the adaptation of special crops to special soils in this area. It is, however, in the more general farm crops, and especially in what might be termed the tyranny of the cotton staple, that the question of adaptation of crop to soil is largely overlooked and a conventional routine of culture on different soils and in differing seasons too blindly adhered to. The soils in Dallas County are as widely different in character as is well possible, and in an area which possesses so many varying types and which is by nature so well suited to an intelligent diversification of crops, the need of more specific consideration of the soil in its relation to the required crop or quality of crop is to be emphasized.

The transportation facilities of the county are exceptionally good. The Southern Railroad has branches to Mobile, Meridian, Birmingham, and Rome, Ga., which intersect the county, while the Louisville and Nashville Railroad has branches from Selma to Pensacola and to Myrtlewood, and the Western Railway of Alabama has a line from Selma to Montgomery. Thus at least seven distinct railway lines traverse the county in nearly all directions, while the Alabama River, with boats to Mobile and Montgomery, is a channel for steamboat transportation through the heart of the county.

The county roads are in general unimproved, and travel with teams is somewhat discouraging. The prairie roads are excellent in summer, but become impassable and utterly unfit for travel in winter. The sandier sections offer better roadways, but in summer become very dry and sandy.

The only local market in the area for cotton is Selma, the county seat, where in the neighborhood of 100,000 bales of cotton are handled from this and adjoining counties. Some cotton is also taken to Uniontown, in Perry County, but Selma is the general market for the staple farm crops and the chief center for wholesale distribution in the county. The northern and central cities, as far as Pittsburgh, Cleveland, and St. Louis, offer markets for early truck and peaches.

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U S DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP

ALABAMA
DALLAS COUNTY SHEET

SOIL PROFILE
(3 feet deep)

Norfolk sand
S
S

Norfolk fine sand
Sf
Sf

Orangeburg fine sand
Sf
Osc

Norfolk fine sandy loam
Sf
Osc

Orangeburg fine sandy loam
Ssc
Osc

Ocklocknee clay
Scc
C

Houston clay
C
C

Orangeburg clay
Sc
Osc

Norfolk clay
Hsc
C

LEGEND
S Sand
Sf Fine sandy loam
Sf Fine sand
Scc Clay loam
C Clay
Sc Loam
Hsc Heavy fine sandy loam

LEGEND
Ns — Norfolk sand
Nfs — Norfolk fine sand
Os — Orangeburg fine sand
Nl — Norfolk fine sandy loam
Ol — Orangeburg fine sandy loam
Oc — Ocklocknee clay
Hc — Houston clay
C — Orangeburg clay
Nc — Norfolk clay
M — Meadow
S — Swamp
Gravelly areas

Soils surveyed by
E.P. Carr, W. Edward Hearn
Hugh H. Bennett and R.T. Avon Burke

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1905